



Instructor Guide to Multilateral Bargaining

Laboratory implementation, theoretical foundations,
experimental evidence, and variants

Behavioral and Experimental Economics Research Lab
Department of Economics



Revised edition | October 2026

<https://beer-lab.org/>

How to use this guide

This guide supports the preparation, implementation, and classroom discussion of the multilateral bargaining family developed by the Behavioral and Experimental Economics Research Lab (BEER Lab) of the Department of Economics at Tecnológico de Monterrey. It is written for instructors in microeconomics, game theory, political economy, public choice, organizations, and public policy, including readers who have not previously used oTree or taught formal legislative bargaining.

The document places the basic modes and eight extensions in one reference. Early chapters allow an instructor to run a session without technical background.

Conceptual chapters explain agenda power, continuation values, minimum winning coalitions, voting rules, delay, and equality. Variant sections isolate only the mechanism that changes. Every screenshot comes from the executable application and shows the participant or instructor view.

Author

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For the instructor

The guide follows the English interface. Spanish configurations implement the same logic. Project only anonymous aggregate results; never associate seat letters, links, or participant codes with names or student IDs.

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Quick implementation guide

1.1 Access through the updated laboratory website

Start at <https://beer-lab.org/en/>. Select **CLASSROOM** in the top navigation menu; it opens <https://teaching.beer-lab.org/en/>. In the **Classroom experiments** catalog, use the search box to locate the activity by name. You can also filter by **Topic** or **JEL code**. Clear any filters left from an earlier search before looking for another game.

Each family's card distinguishes **Español** and **English** access links. The **Show extended version** checkbox selects that edition before following a link. Catalog language and session language are separate choices: verify both. Students use the room specified by the instructor; the instructor prepares and monitors the session through this family's own administrative pages.



Figure 1.1: Current institutional website. Select CLASSROOM in the top navigation menu to open the teaching experiments. Captured on October 7, 2026.

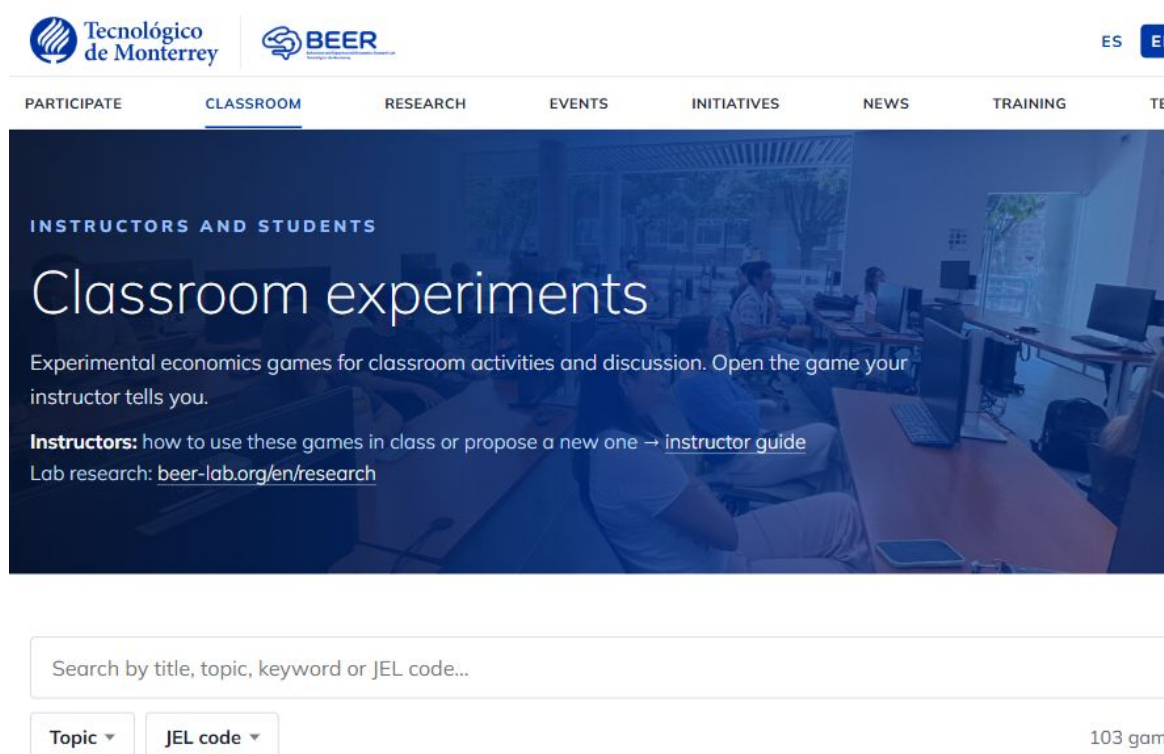


Figure 1.2: Current catalog: search by title, topic, or JEL code. Then locate this family's card and select language and edition. Captured on October 7, 2026.

Checking resources, comprehension, and participant requirements

Before opening the room, check the selected configuration and the number of students present. The session-creation form states the group size and minimum required by that configuration. An individual activity accepts any positive participant count; an interactive activity must satisfy its stated requirement: complete groups when size is fixed, or a minimum participant count when size is flexible. Requirements may change across treatments, for example when adding a third party or changing an institution's size. If you edit a grouping parameter, check the requirement for the edited configuration, rather than relying only on the demo's suggested count.

In the instructions, ensure that students can identify what each role receives, what they can decide, and how the outcome is calculated. An initial account, a distributable budget, and final earnings need not be the same amount. Refer to the resources panel and the example for the selected treatment. Do not carry the basic edition's endowment into a treatment that changes accounts or introduces additional positions.

ECU stands for *Experimental Currency Units*: the activity's unit of account. An outcome of 100 ECU does not automatically equal 100 pesos or 100 dollars. Conversion depends on the session configuration. Before announcing a payment, confirm with the laboratory whether money is paid, the conversion rate, and which decisions count for payment. In hypothetical modules, describe amounts as outcomes in the stated situation.

When a comprehension check is included, an incorrect response receives an explanation beside that question, identifying the submitted answer and the correct answer. Other answers remain in the form. Ask the student to return to the example, locate the relevant rule, and redo the calculation before correcting the response. Avoid revealing answers to the entire class for an individual error, and do not interpret a comprehension mistake as an economic choice in the game.

oTree
Demo
Sessions
Rooms
Data
Server Check
Logout

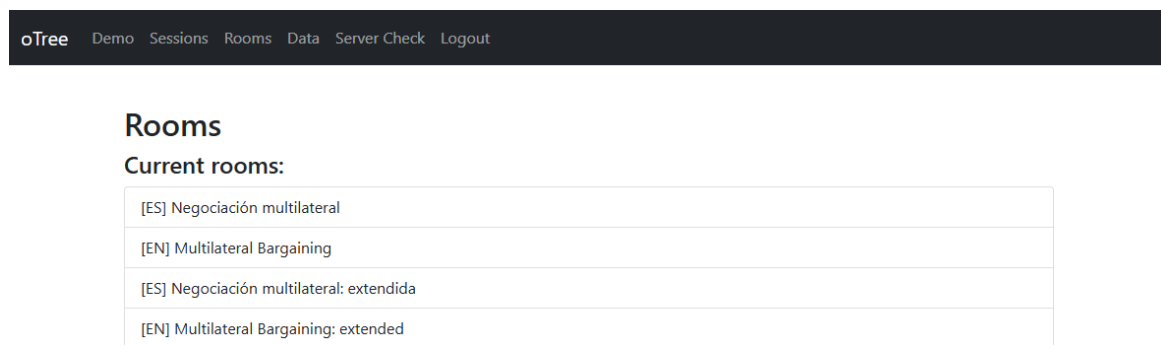
Demo

[ES] Negociación multilateral — una negociación
[ES] Negociación multilateral — 10 negociaciones, mismo comité
[ES] Negociación multilateral — 10 negociaciones, comités reasignados
[EN] Multilateral Bargaining — one negotiation
[EN] Multilateral Bargaining — 10 negotiations, same committee
[EN] Multilateral Bargaining — 10 negotiations, reassigned committees
[ES] Negociación multilateral extendida — mayoría simple
[ES] Negociación multilateral extendida — unanimidad
[ES] Negociación multilateral extendida — supermayoría
[ES] Negociación multilateral extendida — proponente persistente
[ES] Negociación multilateral extendida — reconocimiento desigual
[ES] Negociación multilateral extendida — demora costosa
[ES] Negociación multilateral extendida — comunicación estructurada
[ES] Negociación multilateral extendida — poder de veto
[EN] Extended Multilateral Bargaining — simple majority
[EN] Extended Multilateral Bargaining — unanimity
[EN] Extended Multilateral Bargaining — supermajority
[EN] Extended Multilateral Bargaining — persistent proposer
[EN] Extended Multilateral Bargaining — biased recognition
[EN] Extended Multilateral Bargaining — high delay cost
[EN] Extended Multilateral Bargaining — structured communication
[EN] Extended Multilateral Bargaining — veto power
[ES] Negociación recurrente — reparto inicial cero
[EN] Recurrent bargaining — zero initial allocation
[ES] Negociación recurrente — reparto inicial igualitario
[EN] Recurrent bargaining — equal initial allocation
[ES] Negociación recurrente — reparto inicial concentrado
[EN] Recurrent bargaining — concentrated initial allocation
[ES] Negociación recurrente — reparto inicial con remanente
[EN] Recurrent bargaining — initial allocation with unused resources
[ES] Negociación recurrente — propuestas exhaustivas
[EN] Recurrent bargaining — exhaustive proposals
[ES] Negociación recurrente — reconocimiento desigual
[EN] Recurrent bargaining — biased recognition
[ES] Negociación recurrente — menor peso futuro
[EN] Recurrent bargaining — lower future weight

Negociación multilateral / Multilateral Bargaining — BEER Lab

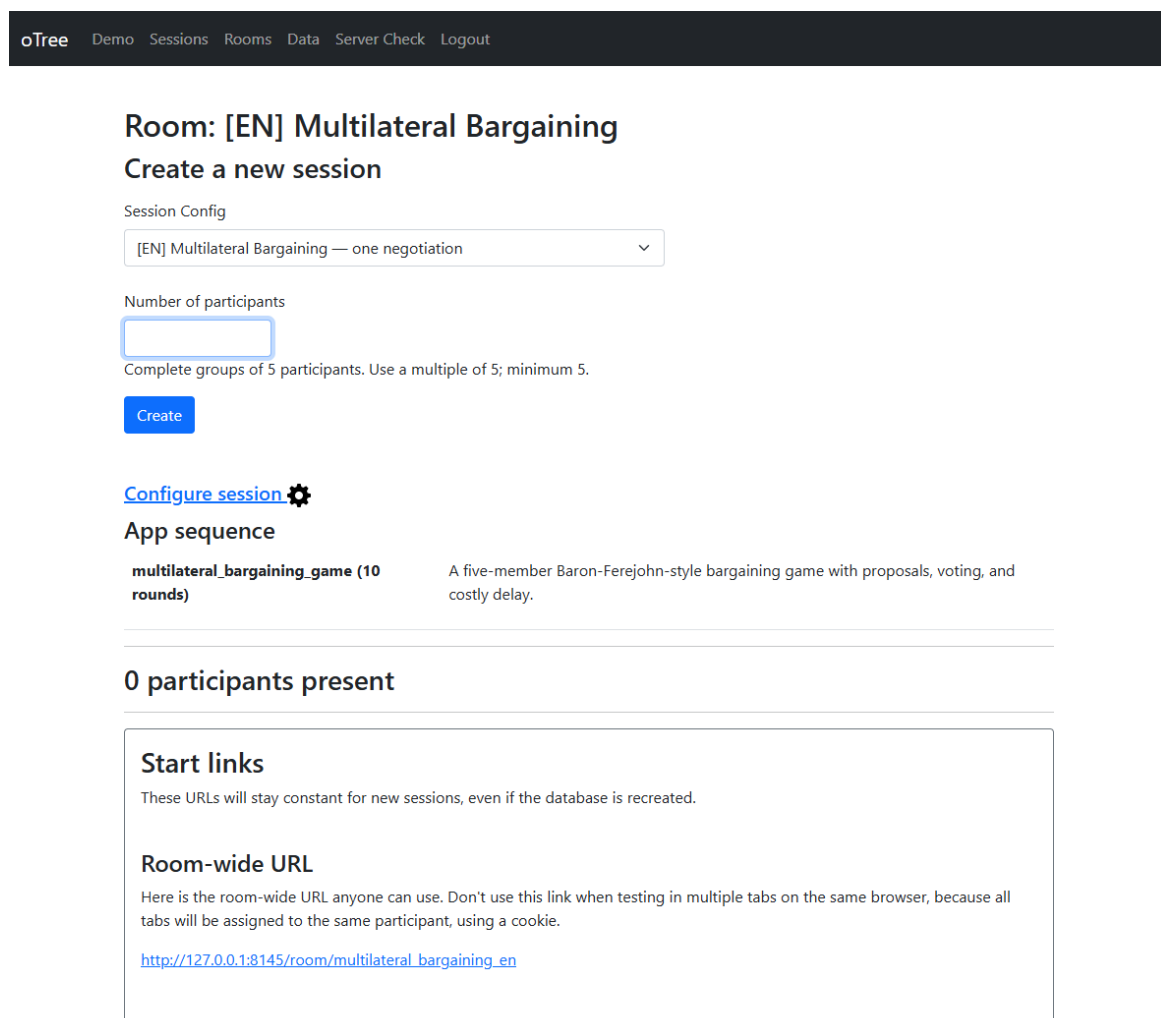
Seleccione una variante de este juego. Select a version of this game.

Figure 1.3: Demo contains only the configurations of this game family, in both languages and editions.



Room
[ES] Negociación multilateral
[EN] Multilateral Bargaining
[ES] Negociación multilateral: extendida
[EN] Multilateral Bargaining: extended

Figure 1.4: Rooms contains the four rooms for this family: basic and extended editions in Spanish and English.



Room: [EN] Multilateral Bargaining

Create a new session

Session Config

[EN] Multilateral Bargaining — one negotiation

Number of participants

5

Complete groups of 5 participants. Use a multiple of 5; minimum 5.

Create

[Configure session](#) ⚙️

App sequence

multilateral_bargaining_game (10 rounds) A five-member Baron-Ferejohn-style bargaining game with proposals, voting, and costly delay.

0 participants present

Start links

These URLs will stay constant for new sessions, even if the database is recreated.

Room-wide URL

Here is the room-wide URL anyone can use. Don't use this link when testing in multiple tabs on the same browser, because all tabs will be assigned to the same participant, using a cookie.

http://127.0.0.1:8145/room/multilateral_bargaining_en

Figure 1.5: Session-creation form for the basic English room. Check the selected configuration and participant requirement before creating the session.

Downloading a session with several rounds

For the instructor

Open **Data** within the relevant session and use that session's CSV or CSV-for-Excel download link. The general export has one row per participant and columns for the different rounds. Ten rounds do not necessarily mean ten rows per person. When the family provides its own long-format export, observations may instead be organized by participant and round or another unit defined by the design.

Save the original file together with the configuration name, session code, and active-round count. Check that columns for the last active round are present and that the data belong to the selected session. Empty cells can represent inactive rounds, a pending decision, or a field that does not apply to a role; do not automatically recode them as zeros. To compare learning, preserve round and group identifiers alongside participant identifiers. Share only anonymous aggregates in class, and record session incidents before constructing derived tables.

1.2 Basic facts

Purpose	Understand how proposal and voting rules determine coalitions, allocation, power, and delay costs.
Experimental unit	Five-member committee, with seats A–E.
Unit of account	Experimental currency units (ECU).
Suggested duration	30–45 minutes for one negotiation; 60–90 minutes for ten negotiations and feedback.
Requirement	Attendance must be divisible by five.
Participants	Basic English room .
Instructor	multilateralbargaining.beer-lab.org/demo .
Results	Agreement, period, budget, proposer share, coalition, inclusion, inequality, and acceptance by offer.
Basic edition	one negotiation; 10 negotiations, same committee; 10 negotiations, reassigned committees.
Extended edition	simple majority; unanimity; supermajority; persistent proposer; biased recognition; high delay cost; structured communication; veto power; recurrent allocation and seven modes.
Decision	Propose an allocation and vote on allocation proposals within the group.
Outcome	Agreed allocation or disagreement outcome, with the treatment's discounting and voting rules.
Topics	multilateral bargaining; coalitions; voting rules; persistent status quo; continuation and unallocated resources.
JEL	C78; C92; D72.

Attention

The subdomain and routes are proposed for laboratory deployment. The code defines four rooms and 36 configurations, but public availability depends on DNS and server deployment. Use <http://localhost:8145/demo> for local validation.

1.3 Learning objectives

Students should distinguish bilateral from multilateral bargaining; explain why agenda control creates power even when each member has one vote; identify a minimum winning coalition; calculate simple continuation values; anticipate the effects of majority, supermajority, unanimity, and veto rules; and separate distributive equality from timely efficiency. They should also learn that a proposal is evaluated against what may happen after rejection rather than against an abstract ideal division.

The activity connects game-theoretic tools to observable institutions. A committee can represent a legislature, corporate board, governing coalition, budget team, or departments competing for common resources. Institutional analogies aid interpretation, while the task remains neutral: members divide ECU and do not represent actual parties, identities, or political issues.

An additional objective is evidence literacy. A high proposer share may indicate agenda power; a generous offer may reflect rejection concerns, reciprocity, or equality norms; delay may be strategic investment or coordination failure. The report does not identify motives automatically. Instructors use comparisons across treatments, rounds, and offer sizes to construct disciplined explanations.

1.4 Operational sequence

1. Confirm that attendance is divisible by five and select language, edition, and treatment.
2. Enter through beer-lab.org, open teaching.beer-lab.org, and select multilateral bargaining.
3. Create the session from the appropriate room and keep **Monitor** and **Report** open.
4. Share only the room link. Do not distribute saved participant links.
5. Enforce silence, complete comprehension, and let the first negotiation proceed without strategic hints.
6. Before revealing, elicit predictions about agreement, proposer share, exclusion, and delay.
7. Reveal aggregates, describe facts, and only then discuss equilibrium and behavioral explanations.
8. Export data when needed and document course, date, configuration, and treatment.

Checkpoint

Verify five items before opening the room: five participants per committee, correct language, correct edition, approval rule, and number of negotiations. Create a new session if any item is wrong.

1.5 An 80-minute lesson

Allow ten minutes for access and laboratory rules, ten for comprehension, twenty for early negotiations, fifteen for the remaining repetitions, and twenty-five for feedback. With a one-negotiation configuration, use the extra time to solve continuation values and compare candidate allocations. In repeated sessions, avoid commenting after each outcome because instructor intervention changes learning and coalition formation.

Before play, ask every student to write an expected allocation and vote total. Before reveal, elicit the share of proposals expected to pass immediately, the amount proposers retain, and the number of excluded members. Keep predictions visible. The gap between forecast and result turns the report into evidence and limits after-the-fact rationalization.

Access, isolation, and session creation

2.1 Institutional route

The route begins at beer-lab.org and continues through teaching.beer-lab.org. The proposed family instance is multilateralbargaining.beer-lab.org. Its **Demo**, **Rooms**, **Sessions**, and **Data** pages must show only the 36 configurations and four rooms in this family. Isolation prevents accidental selection of another game and keeps data exports separate.

If unrelated families appear, the instance was not started with `GAME_FAMILY=multilateralbargaining` or deployment isolation is incorrect. Do not proceed. Verbal instructions are not an adequate workaround: the catalog and database must be isolated so instructors cannot start another game and historical sessions do not mix across families.

2.2 Four rooms

Room	Options	Use
<code>negociacion_multilateral_es</code>	3	One or ten negotiations in Spanish, with fixed or reassigned committees.
<code>multilateral_bargaining_en</code>	3	The same basic modes in English.
<code>negociacion_multilateral_extendida</code>	8	Eight extended institutions in Spanish.
<code>multilateral_bargaining_extended</code>	8	The same eight institutions in English.

The room is the stable participant route. When a session starts, oTree assigns anonymous links and places participants in committees. Links from a prior session may become invalid after a database change; never recycle a saved URL. Use **Demo** for rehearsal and **Rooms** in class so participants enter through one shared address and join the active session.

2.3 Monitor, report, and closure

Open Monitor and Report before sharing the link. Monitor distinguishes a normal wait from a disconnection. Four responders may wait while a proposer allocates, and the proposer may wait while four responders vote. Do not refresh or manually advance someone who is on a legitimate wait page.

oTree
Demo
Sessions
Rooms
Data
Server Check
Logout

[EN] Multilateral Bargaining — one negotiation: session 'cnvkekn3' (demo)

New
Links
Monitor
Data
Payments
Report
Description

Below are temporary links for testing and demonstration. To launch a real study, either create persistent links by setting up a [room](#), or create a session through the [sessions page](#).

Choose one of the following options to play the session:

Split-screen view
[Launch](#)

Grid view
[Launch](#)

Session-wide testing link
Open the below link in up to 5 browser tabs.

<http://127.0.0.1:8051/join/perugale>

Single-use links
Open each link in its own browser tab.

P1	http://127.0.0.1:8051/InitializeParticipant/tp7n67am
P2	http://127.0.0.1:8051/InitializeParticipant/p60ro6nn
P3	http://127.0.0.1:8051/InitializeParticipant/8u3g8e84
P4	http://127.0.0.1:8051/InitializeParticipant/6olc3sdu
P5	http://127.0.0.1:8051/InitializeParticipant/felv0478

Figure 2.1: Session links and instructor controls.

The report shows progress without revealing decisions. Its button activates only after all active negotiations finish. This barrier protects participants still deciding and prevents feedback during play. At the end, confirm that everyone reached the closing screen, reveal aggregates, export data when appropriate, and record the treatment used.

Participant experience

3.1 Welcome and instructions

The cover identifies the BEER Lab and Tecnológico de Monterrey, explains the learning purpose, and presents silence, privacy, navigation, and help rules. Explicit acceptance keeps the rules from becoming decorative text. The instructions then show the sequence, approval quota, delay factor, any veto requirement, and all three period budgets.

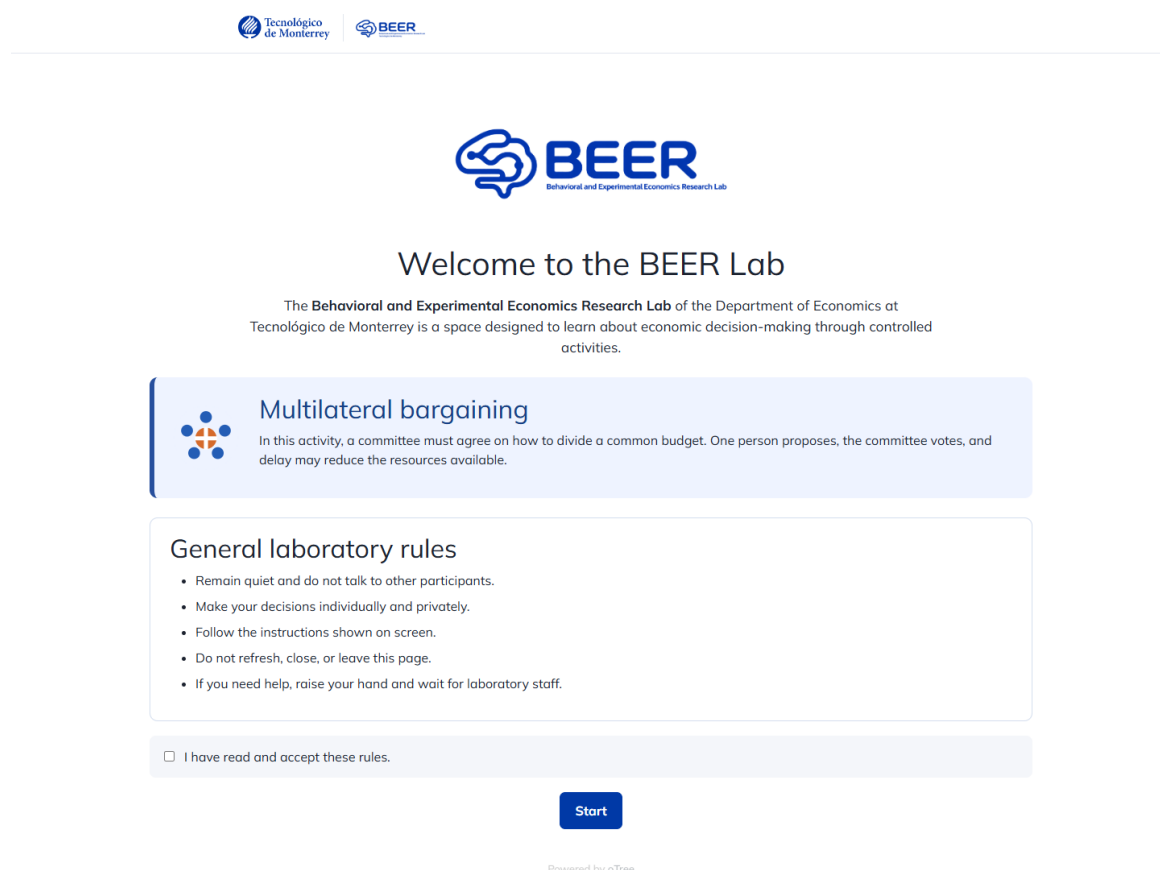


Figure 3.1: Beginning of the English participant experience. Institutional welcome and rules.

Letters A–E identify experimental seats rather than people. A participant may move across committees under reassignment but always sees the current letter. Proposal rights are announced each period. Visual cards separate proposer, budget, quota, and allocations so participants recognize their situation before making a choice.






Basic version · one negotiation

How bargaining works

Your committee has five members, labeled A, B, C, D, and E. In each period, one person has the right to propose a distribution.

Resources and unit of account

The committee's initial joint budget is 100 ECU, to be allocated among its members.

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

This session does not convert ECU into real money.

Simple majority

Three of five votes are required; the proposer can form a minimum winning coalition.

Sequence

1. The system designates the proposer.
2. The proposer divides the entire budget among the five members.
3. The proposer's vote automatically counts in favor; the others vote to accept or reject.
4. If the required quota is reached, the proposal is implemented.
5. If it is not reached, another period starts with a smaller budget. After the third rejection, everyone receives 0 ECU.

Institution in this session

Initial budget	100 ECU
Votes required	3/5
Budget retained after each rejection	80%
Veto member	—

Your payoff for the negotiation is the amount you receive in the approved proposal. If there is no agreement, you receive 0 ECU.

Budgets by period

Period 1
100 ECU

Period 2
80 ECU

Period 3
64 ECU

Continue

Powered by [oTree](#)

Figure 3.2: Current basic-edition instructions, with initial resources and experimental units.

3.2 Comprehension

Three questions verify the initial budget, required affirmative votes, and consequence of rejection. Answers adapt to the treatment: majority requires three, supermajority four, and unanimity five. The delay item forces recognition that rejection does not preserve the pie. Error messages explain the rule without recommending a strategy.




Review the marked questions. Each shows your answer and an explanation; your other answers are retained.



Basic version

Comprehension check

Answer correctly before making decisions.

Resources and unit of account

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

This session does not convert ECU into real money.

Simple majority Three of five votes are required; the proposer can form a minimum winning coalition.

How many ECU are available initially? 101

Your answer: 101. The correct answer is 100. The initial budget is 100 ECU.

How many affirmative votes are required? 3

What happens to the budget after a rejection? It shrinks ▼

Continue

Powered by [oTree](#)

Figure 3.3: Current comprehension check with an incorrect answer, its specific explanation, and retained responses.

If several students miss the quota, draw five votes and include the proposer's automatic vote. If they miss delay, display 100, 80, and 64, or 100, 60, and 36 in the high-cost treatment. Do not state which offer a participant should accept; that assessment depends on continuation values, beliefs, and distributional preferences.

3.3 Proposal and vote

The proposer allocates the entire pie in nonnegative integers. The platform blocks a submission whose sum differs from the current budget. The proposer's own row is highlighted, and member E is marked in the veto treatment. Under communication, non-binding requests appear above the form, while the proposer remains free to disregard them.

Every responder sees the complete distribution, personal allocation, proposer identity, and quota. Accept supports the whole proposal; reject moves bargaining forward only if the quota fails. The





Negotiation 1 of 1 - Period 1

Prepare the proposal

Allocate the entire budget exactly. You may assign any nonnegative integer amount to each member.

Simple majority

Three of five votes are required; the proposer can form a minimum winning coalition.

Proposer
C

Initial budget
100 ECU

Votes required
3/5

Member	Allocation
A	ECU
B	ECU
C - you	ECU
D	ECU
E	ECU

Submit proposal

Powered by 

Figure 3.4: The two roles use a consistent visual distinction. Proposal form.





Negotiation 1 of 1 - Period 1

Vote on the proposal

Review the entire distribution and decide privately. The proposer's vote already counts in favor.

Simple majority

Three of five votes are required; the proposer can form a minimum winning coalition.

Proposer
C

Initial budget
100 ECU

Votes required
3/5

Your allocation if approved
20 ECU

A - you
20 ECU

B
20 ECU

C
20 ECU

D
20 ECU

E
20 ECU

☐ Accept

☐ Reject

Submit vote

Powered by 

Figure 3.5: Complete allocation and private vote.

proposer's vote already counts and is not requested again. Responders vote simultaneously and do not observe others' votes before the outcome.

What participants will see

The voting screen does not label either action as correct. It presents the institution, offer, and consequences. The strategic comparison is between the offer and the expected continuation value, possibly modified by reciprocity or inequality concerns.

3.4 Outcome, report, and final page

After approval, the outcome shows period, votes, distributed budget, delay loss, proposer identity and allocation, full distribution, and personal earnings. Three failed proposals produce zero for every member and an explicit breakdown message. The final summary aggregates negotiations, agreements, proposer assignments, mean allocation, and ECU.

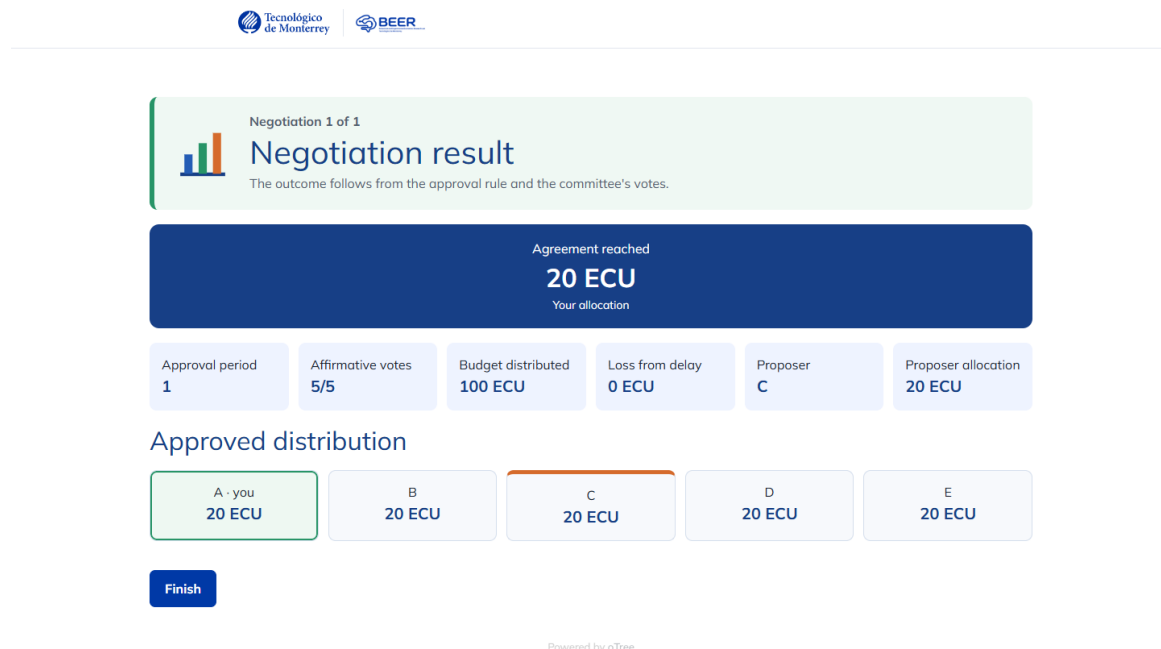


Figure 3.6: Private outcome and classroom evidence. Individual result and approved distribution.

Separating individual results from aggregate reporting is deliberate. Participants know their committee outcome; the class sees anonymous patterns. The closing screen confirms completion and asks participants to wait for the instructor, avoiding a technical “No more pages left” ending.

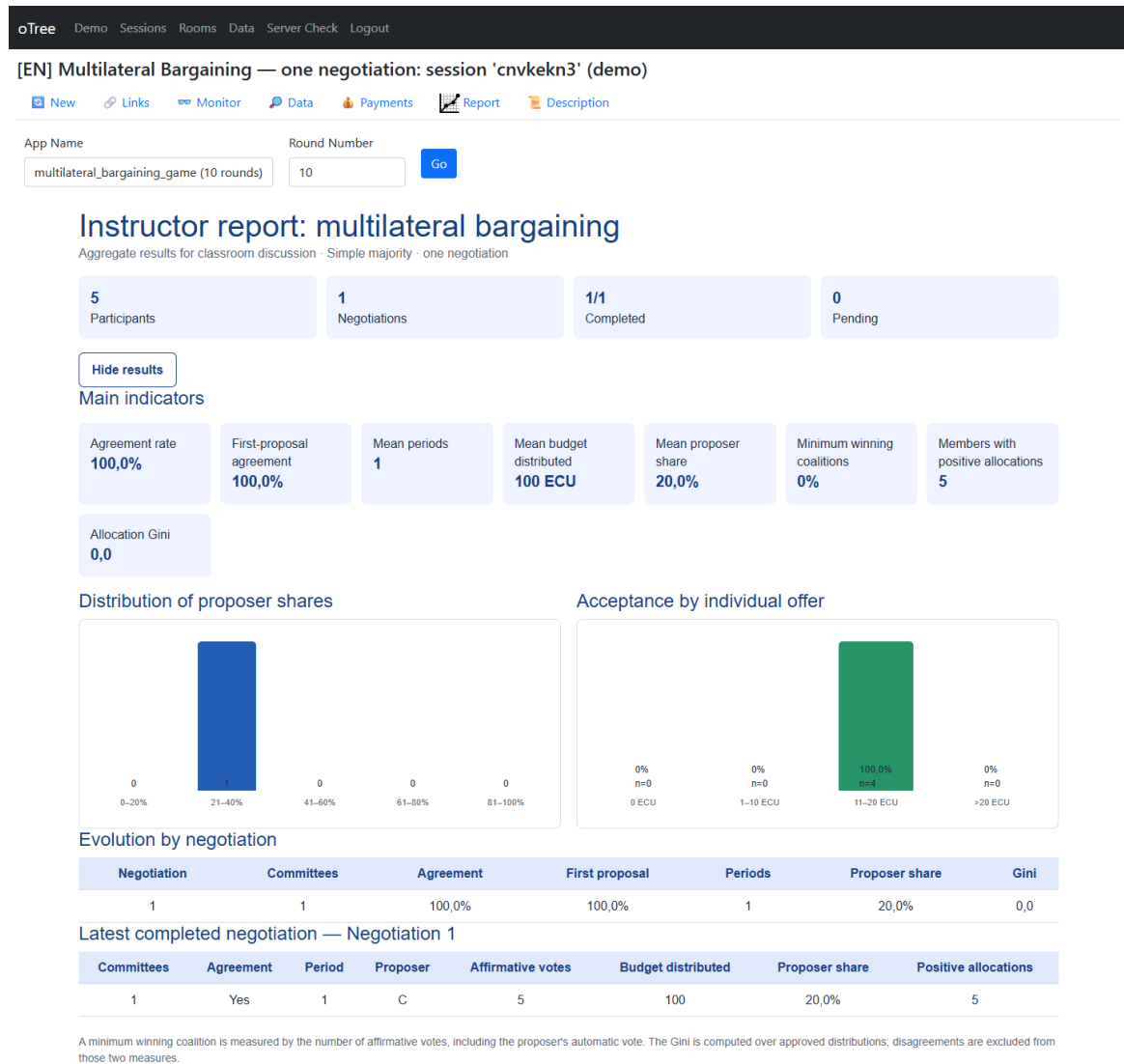


Figure 3.7: Revealed aggregate instructor report.

Mechanism and accounting

4.1 Formal sequence

Five members divide an initial pie $B_1 = 100$. In period t , the system recognizes proposer p_t , who chooses $x_t = (x_{At}, \dots, x_{Et})$ with $x_{it} \geq 0$ and $\sum_i x_{it} = B_t$. The complete allocation receives a closed vote. The proposer automatically votes yes and four responders privately choose yes or no.

Approval occurs when affirmative votes reach quota q and, under veto, E also votes yes. Approved payoffs equal the proposed allocations. After an early rejection, $B_{t+1} = \delta B_t$, rounded to integer ECU. The benchmark uses $\delta = 0.80$ and high delay cost uses $\delta = 0.60$. A third rejection gives everyone zero.

The sequence is a finite classroom adaptation of [Baron and Ferejohn \(1989\)](#). Three periods make ten negotiations feasible and render delay visible. It is not a literal replication of an infinite horizon. Exact predictions change near the terminal period, so the guide uses stationary benchmarks for intuition and identifies the role of finiteness explicitly.

4.2 Worked example

Under simple majority, $q = 3$ and $\delta = 0.80$. Suppose C proposes (10, 16, 58, 16, 0) and therefore keeps 58. C needs two additional supporters. If A and D accept, A, C, and D provide three votes and implement the allocation. B and E may vote no because their support is unnecessary. Payoffs are exactly 10, 16, 58, 16, and 0.

If support fails, period two has 80 ECU. Suppose E proposes (16, 0, 16, 0, 48) and receives A, C, and E's votes. Delay destroyed 20 ECU. E retained 60 percent of the available pie but received only 48 ECU, less than C would have earned from early agreement. Percent shares and absolute payoffs must therefore be read together.

In a stationary benchmark with equal recognition and discount factor 0.80, symmetric ex ante value is 20 ECU and discounted continuation value is approximately 16. A proposer buying two votes might offer 16 to two responders and retain 68. The number is a strategic benchmark rather than a fairness norm or an exact finite-horizon prediction.

Checkpoint

Always verify that allocations sum to the current pie, the automatic proposer vote is counted once, and proposer share is divided by the pie actually distributed rather than by 100 after delay.

4.3 Coalitions, inclusion, and equality

A winning coalition contains enough affirmative votes. A minimum winning coalition has three votes under majority, four under supermajority, and five under unanimity. The report defines minimum by votes. It need not equal the set of positive allocations: a paid responder can vote no, and a responder offered little can vote yes.

Inclusion is the number of members receiving positive ECU. Equality is summarized by the Gini coefficient over an approved allocation. These are distinct: five people can receive positive but highly unequal amounts, while three can receive similar amounts and two receive zero. Both measures should be shown before making claims about fairness.

Timely efficiency uses agreement, period, and final budget. An equal third-period allocation divides only 64 ECU; an unequal first-period agreement divides 100. The activity exposes tradeoffs among equality, protection from exclusion, and preserving surplus without assuming one metric ranks every institution.

Strategic theory

5.1 Backward induction and continuation values

A responder does not compare an offer only with zero. Rejection may yield an allocation next period, proposal rights, or eventual breakdown. The expected utility of those possibilities is the continuation value. A materially acceptable offer meets or exceeds that value, although social preferences can change the observed threshold.

In the final period, rejection leads to zero. An ECU-only player accepts any positive amount and is indifferent at zero. In period two, the threshold incorporates the third period; in period one, two future stages matter. Backward induction gives the logic, although changing proposer identities and indifference can require equilibrium-selection assumptions for a unique number.

For introductory teaching, use the infinite-horizon stationary benchmark. With five symmetric players and equal recognition, each has an ex ante claim of one fifth. With discount δ , buying a vote costs roughly $\delta B/5$. At $B = 100$ and $\delta = 0.8$, the value is 16. Under majority, the proposer purchases two votes and retains about 68. The robust comparative prediction is that more required votes or a better future makes a coalition more expensive.

Theoretical foundation

Proposer advantage does not come from casting more votes. It comes from selecting the proposal on the agenda and concentrating payments on necessary supporters. Agenda power and voting power are different sources of influence.

5.2 Approval rules

At $q = 3$, two members can be excluded. At $q = 4$, one can be excluded. At $q = 5$, everyone is indispensable. Raising the quota increases expected coalition cost and tends to lower proposer share. It also raises the chance of rejection because more participants must regard the proposal as acceptable.

This comparison is a constitutional-design problem. Majority lowers decision costs but permits an excluded minority. Unanimity protects everyone while creating blocking power and potential delay. Supermajority combines elements of both. The laboratory makes the tradeoff observable rather than resolving it with a normative assertion.

Veto differs from a higher quota. Under majority plus E's veto, E is indispensable while one other member may still be excluded. The set of admissible coalitions changes asymmetrically. The distinction maps to chambers, boards, shareholders, and regulatory procedures in which one office

must consent even when a majority supports a proposal.

5.3 Recognition and persistence

Proposal rights are valuable because they permit coalition design and residual appropriation. Under equal recognition, expected opportunities are symmetric even when realized luck favors one member. Under biased recognition, A proposes more often and should earn more cumulatively. Several negotiations are required because realized frequencies can differ sharply from theoretical probabilities in a small class.

Persistence changes the rejection threat. If the same proposer continues, responders cannot expect immediate agenda control. The pie shrinks while authority stays fixed. If a new member may be recognized, rejection includes the chance to propose. Recognition procedure therefore changes reservation prices without changing the vote quota.

Repeated committees may punish exclusion, reward an ally, or rotate coalitions. These history-dependent patterns are outside the simplest stationary equilibrium. The evolution table helps separate a stable institutional advantage from relationships that emerge during the session.

5.4 Social preferences and off-equilibrium behavior

Experiments often find more inclusive proposals and smaller proposer shares than the material benchmark. Inequality aversion can make a responder reject a positive amount when the gap is large. Reciprocity can reward generosity or punish exclusion. Equal division at 20 ECU per person is a salient focal point.

These forces do not make material theory irrelevant. Equilibrium identifies institutional pressure and gives a disciplined baseline. When behavior shifts with quota, delay, or communication, strategic structure matters even if levels differ. Classroom analysis should emphasize comparisons and mechanisms rather than demand perfect point prediction.

Learning matters as well. Early proposers may overpay because they fear rejection, and responders may reject without calculating lost surplus. With repetition, offers may approach experienced thresholds and coalitions can stabilize. A trend is consistent with adaptation but does not by itself prove equilibrium convergence.

Predictions, report, and feedback

6.1 Recordable predictions

Before play, elicit proposer share, number of positive recipients, immediate-agreement probability, and expected period. Ask who will be excluded. For an institutional treatment, record the predicted direction relative to majority. Written predictions make explanations falsifiable and improve feedback.

The material benchmark predicts minimum coalitions, proposer concentration, and responses to continuation values. Social preferences predict greater equality and inclusion. Reciprocity predicts sensitivity to past treatment. Learning predicts evolution. Do not add an explanation after observing the data without stating what observation could have contradicted it.

6.2 Reading the report

Begin with progress and denominators. Read agreement and first-proposal agreement, then periods and mean budget. Next inspect proposer share, minimum coalitions, positive allocations, and Gini. Finish with histograms, acceptance by offer, evolution, and the latest negotiation. This order separates timing efficiency, allocation, and voting behavior.

The proposer histogram counts agreements in percentage bins. Acceptance by offer pools responder votes by ECU received and reports both rate and n . A 100 percent rate with $n = 1$ is weaker than 80 percent with $n = 40$. Evolution reveals learning; the latest table reconstructs concrete group outcomes without identifying individuals.

Feedback script

1. State completion and agreement denominators.
2. Quantify delay with first-proposal agreement and mean pie.
3. Describe proposer share, inclusion, and Gini.
4. Connect vote rates to offer intervals and sample sizes.
5. Compare the result with the recorded prediction and an alternative mechanism.
6. End with an institutional counterfactual involving quota, delay, or communication.

6.3 Invalid inferences

An approved proposal is not necessarily fair because a majority authorized it. A yes vote need not imply satisfaction; it may reflect a worse continuation. Positive allocation is not the voting coalition. Payoff differences by letter should not be attributed to biased recognition without checking proposer frequency. A Gini calculated only for agreements should not hide breakdowns.

Nor is disagreement automatically irrational. It may reflect a plausible continuation belief, distributional norm, reputation strategy, or error. Distinguishing them requires history and treatment comparison. The report orders questions; it does not read individual motives.

6.4 Basic modes

6.5 One negotiation

The one-negotiation mode introduces coalitions and agenda power without learning. Use at least two committees for descriptive comparison. Small samples should be discussed as classroom cases rather than stable estimates.

Derive the quota, elicit an allocation, play, and compare the outcome with equal division, a minimum coalition, and a continuation-value benchmark. Reconstruct one vote in detail: offer, rejection alternative, and pie effect. This mode works in short sessions and as an opening to political economy.

6.6 Ten negotiations with the same committee

The same five members interact again. Recognition may change, but history is shared. Reputation, punishment, loyalty, coalition rotation, and learning can emerge even when stage incentives are formally independent.

Use evolution to detect changes in early agreement, proposer share, and equality. Ask whether the committee developed a convention such as equal division, turns, a stable coalition, or intertemporal compensation. Such conventions are substantive results rather than noise.

6.7 Ten negotiations with reassigned committees

Reassignment changes partners and weakens stable relational agreements. It does not ensure perfect anonymity or statistical independence, but it limits targeted reciprocity. Compare it with fixed committees to discuss reputation and portable norms.

Analyze aggregate evolution rather than tracking people. Persistence of equal division under reassignment may indicate a general convention or distributional preference rather than exchange with particular partners.

Extended variants

7.1 Simple-majority benchmark

The benchmark requires three of five votes and counts the proposer's vote automatically. The proposer therefore needs two of four responders. A proposal can pass while two members oppose it and receive zero. This institution captures the minimum-winning-coalition logic of closed-rule legislative bargaining: a complete allocation is placed on the agenda and the committee can accept or reject it but cannot amend it within the period.

The comparison should begin with the institutional constraint rather than a judgment about whether the allocation is fair. Ask the class to identify how many additional supporters the proposer needs, which members can be excluded from the coalition, and what threat is credible after rejection. This sequence separates formal proposal power, voting power, and the ability to wait. The same ECU amount can have a different strategic meaning when the identity of a blocking member or the probability of making the next proposal changes.

Theoretical foundation

With risk-neutral players who care only about ECU, the proposer seeks the least expensive supporters, offers their continuation values, and keeps the residual. The qualitative prediction is a minimum winning coalition, a proposer share above the egalitarian one-fifth benchmark, and exclusion of unnecessary members.

Legislative bargaining experiments commonly find proposer power but also more generous and inclusive offers than point predictions. Distributional norms and concern about rejection moderate extraction. Treat experimental evidence as a comparison pattern rather than a numerical target every class should reproduce. Sample size, participant experience, and group history can shift levels. The robust teaching question is whether the institutional change moves agreement, delay, inclusion, or proposer share in the predicted direction.

In the report, a minimum winning coalition is an approved proposal with exactly three affirmative votes. Do not confuse that voting measure with the number of positive allocations: a proposer may pay someone who votes no or obtain support from someone receiving a small offer. Compare agreement rates and periods used first; then inspect proposer share, the number of positive allocations, and the Gini coefficient. Finally, use the acceptance-by-offer graph to determine whether apparent proposer power was sustained by larger offers to pivotal voters or by voters accepting small amounts.

For the instructor

Use this treatment to establish the baseline. Ask for an exact allocation of 100 ECU before play and preserve those predictions for comparison with the seven extensions. Before revealing results, request a quantitative prediction and a causal explanation. After revealing, compare mechanism, outcome, and an alternative interpretation based on reciprocity, inequality aversion, or learning.

7.2 Unanimity

Unanimity requires all five votes. Every responder can block the proposal individually, so no member can be excluded from an agreement. The budget still shrinks after rejection and the collective cost of delay remains visible.

The comparison should begin with the institutional constraint rather than a judgment about whether the allocation is fair. Ask the class to identify how many additional supporters the proposer needs, which members can be excluded from the coalition, and what threat is credible after rejection. This sequence separates formal proposal power, voting power, and the ability to wait. The same ECU amount can have a different strategic meaning when the identity of a blocking member or the probability of making the next proposal changes.

Theoretical foundation

The rule removes approval through exclusion. Responders should demand more, the allocation should include everyone, and proposer share should fall. At the same time, coordinating five approvals can increase rejection and delay.

Miller and Vanberg document more costly delay under unanimity and more inclusive distributions. The comparison illustrates the tension between individual protection and decision cost. Treat experimental evidence as a comparison pattern rather than a numerical target every class should reproduce. Sample size, participant experience, and group history can shift levels. The robust teaching question is whether the institutional change moves agreement, delay, inclusion, or proposer share in the predicted direction.

Read positive allocations, Gini, agreement rate, and mean distributed budget together. Greater equality accompanied by more delay is not a contradiction; both may follow from the same rule. Compare agreement rates and periods used first; then inspect proposer share, the number of positive allocations, and the Gini coefficient. Finally, use the acceptance-by-offer graph to determine whether apparent proposer power was sustained by larger offers to pivotal voters or by voters accepting small amounts.

For the instructor

Do not frame unanimity as simply better or worse. Organize the discussion around protection from exclusion and the value lost when universal consent is required. Before revealing results, request a quantitative prediction and a causal explanation. After revealing, compare mechanism, outcome, and an alternative interpretation based on reciprocity, inequality aversion, or learning.

7.3 Four-vote supermajority

The supermajority is institutionally intermediate. The proposer needs three additional supporters and may exclude only one person. It shows how a discrete change in the quota transforms the necessary coalition while budget and committee size remain fixed.

The comparison should begin with the institutional constraint rather than a judgment about whether the allocation is fair. Ask the class to identify how many additional supporters the proposer needs, which members can be excluded from the coalition, and what threat is credible after rejection. This sequence separates formal proposal power, voting power, and the ability to wait. The same ECU amount can have a different strategic meaning when the identity of a blocking member or the probability of making the next proposal changes.

Theoretical foundation

Relative to simple majority, expect greater inclusion and a smaller proposer share. Relative to unanimity, one member can still be excluded and delay should be lower. The prediction combines stronger protection with moderate decision cost.

Research on decision rules shows that group size and quota affect delay and allocation. Effects are not mechanical because equality norms also respond to context. Treat experimental evidence as a comparison pattern rather than a numerical target every class should reproduce. Sample size, participant experience, and group history can shift levels. The robust teaching question is whether the institutional change moves agreement, delay, inclusion, or proposer share in the predicted direction.

Place first-proposal agreement, mean periods, positive allocations, and Gini on one slide. The four measures show whether the quota operated through delay, distribution, or both. Compare agreement rates and periods used first; then inspect proposer share, the number of positive allocations, and the Gini coefficient. Finally, use the acceptance-by-offer graph to determine whether apparent proposer power was sustained by larger offers to pivotal voters or by voters accepting small amounts.

For the instructor

Ask students to identify the single potentially excludable member. Then ask whether that identity should rotate, depend on the cheapest vote, or reflect relationships built in earlier negotiations. Before revealing results, request a quantitative prediction and a causal explanation. After revealing, compare mechanism, outcome, and an alternative interpretation based on reciprocity, inequality aversion, or learning.

7.4 Persistent proposer

The same member retains proposal rights after rejection. Responders cannot reject in the hope of becoming the next proposer. The budget shrinks, but agenda control stays in the same hands.

The comparison should begin with the institutional constraint rather than a judgment about whether the allocation is fair. Ask the class to identify how many additional supporters the proposer needs, which members can be excluded from the coalition, and what threat is credible after rejection. This sequence separates formal proposal power, voting power, and the ability to wait. The same ECU amount can have a different strategic meaning when the identity of a blocking member or the probability of making the next proposal changes.

Theoretical foundation

Persistence strengthens the proposer by lowering responders' continuation values and may increase proposer share. It can also reduce delay once voters understand that waiting does not change agenda control.

Bargaining theory separates the material value of waiting from the chance of gaining authority later. This extension isolates the second source without changing the voting quota. Treat experimental evidence as a comparison pattern rather than a numerical target every class should reproduce. Sample size, participant experience, and group history can shift levels. The robust teaching question is whether the institutional change moves agreement, delay, inclusion, or proposer share in the predicted direction.

Use proposer share and periods as primary indicators. Check whether responders accept smaller offers when they know they will not inherit proposal rights immediately. Compare agreement rates and periods used first; then inspect proposer share, the number of positive allocations, and the Gini coefficient. Finally, use the acceptance-by-offer graph to determine whether apparent proposer power was sustained by larger offers to pivotal voters or by voters accepting small amounts.

For the instructor

Compare with simple majority using one question: what does a responder gain by rejecting? The answer changes even though the next-period budget is the same. Before revealing results, request a quantitative prediction and a causal explanation. After revealing, compare mechanism, outcome, and an alternative interpretation based on reciprocity, inequality aversion, or learning.

7.5 Biased recognition

Member A has a one-half probability of recognition and every other member has a one-eighth probability. A nominal position becomes a repeated agenda advantage. The rule is public so probabilities are common knowledge.

The comparison should begin with the institutional constraint rather than a judgment about whether the allocation is fair. Ask the class to identify how many additional supporters the proposer needs, which members can be excluded from the coalition, and what threat is credible after rejection. This sequence separates formal proposal power, voting power, and the ability to wait. The same ECU amount can have a different strategic meaning when the identity of a blocking member or the probability of making the next proposal changes.

Theoretical foundation

A should earn more in expectation because A proposes more often. Recognition also changes the cost of buying votes and how others treat A when A is not proposer. The prediction concerns expected payoffs and frequency, not that A must receive more in every negotiation.

Experiments with unequal recognition and voting weights find effects of nominal power, moderated by equal-treatment norms and history-dependent behavior. Treat experimental evidence as a comparison pattern rather than a numerical target every class should reproduce. Sample size, participant experience, and group history can shift levels. The robust teaching question is whether the institutional change moves agreement, delay, inclusion, or proposer share in the predicted direction.

Before comparing payoffs by letter, verify how often each seat proposed. Realized frequency

can differ sharply from 50 percent in a small class. Separate random variation from strategic response. Compare agreement rates and periods used first; then inspect proposer share, the number of positive allocations, and the Gini coefficient. Finally, use the acceptance-by-offer graph to determine whether apparent proposer power was sustained by larger offers to pivotal voters or by voters accepting small amounts.

For the instructor

Use several negotiations and two committees when possible. Decompose payoff into returns when proposing and when responding so frequency is not confused with behavior within a proposal. Before revealing results, request a quantitative prediction and a causal explanation. After revealing, compare mechanism, outcome, and an alternative interpretation based on reciprocity, inequality aversion, or learning.

7.6 High delay cost

After rejection, only 60 percent of the previous budget remains rather than 80 percent. The three pies are 100, 60, and 36 ECU. Waiting therefore imposes a severe and visible collective loss.

The comparison should begin with the institutional constraint rather than a judgment about whether the allocation is fair. Ask the class to identify how many additional supporters the proposer needs, which members can be excluded from the coalition, and what threat is credible after rejection. This sequence separates formal proposal power, voting power, and the ability to wait. The same ECU amount can have a different strategic meaning when the identity of a blocking member or the probability of making the next proposal changes.

Theoretical foundation

A higher delay cost lowers continuation values and should encourage early agreement with smaller offers. If rejection persists, the mean distributed budget falls quickly. Fairness concerns may partly offset the time pressure.

Variation in discounting is central to the model and accumulated evidence. Meta-analytic work finds demanding point predictions but systematic relationships among parameters, delay, and distribution. Treat experimental evidence as a comparison pattern rather than a numerical target every class should reproduce. Sample size, participant experience, and group history can shift levels. The robust teaching question is whether the institutional change moves agreement, delay, inclusion, or proposer share in the predicted direction.

Compare first-proposal agreement, mean periods, and final budget. Similar agreement rates can conceal much greater inefficiency when rejections occur under a 0.60 factor. Compare agreement rates and periods used first; then inspect proposer share, the number of positive allocations, and the Gini coefficient. Finally, use the acceptance-by-offer graph to determine whether apparent proposer power was sustained by larger offers to pivotal voters or by voters accepting small amounts.

For the instructor

Write 100, 60, and 36 on the board. After a rejection, ask how many ECU the committee lost and who expected to benefit from imposing that cost. Before revealing results, request a quantitative prediction and a causal explanation. After revealing, compare mechanism, outcome, and an alternative interpretation based on reciprocity, inequality aversion, or learning.

7.7 Structured communication

Before the first proposal, every responder sends a numerical, non-binding request. The proposer observes all four requests, but messages are not contracts and each responder remains free to vote. Communication is limited to an amount to protect anonymity and experimental control.

The comparison should begin with the institutional constraint rather than a judgment about whether the allocation is fair. Ask the class to identify how many additional supporters the proposer needs, which members can be excluded from the coalition, and what threat is credible after rejection. This sequence separates formal proposal power, voting power, and the ability to wait. The same ECU amount can have a different strategic meaning when the identity of a blocking member or the probability of making the next proposal changes.

Theoretical foundation

Messages may reveal reservation prices, create competition for coalition membership, or coordinate an equality norm. The material benchmark does not require communication, yet extra information may strengthen the proposer by revealing cheap supporters.

Agranov and Tergiman find that pre-proposal communication can increase proposer extraction by organizing competition for coalition places. The result challenges the intuition that communication necessarily equalizes power. Treat experimental evidence as a comparison pattern rather than a numerical target every class should reproduce. Sample size, participant experience, and group history can shift levels. The robust teaching question is whether the institutional change moves agreement, delay, inclusion, or proposer share in the predicted direction.

Relate requests to offers only in aggregate. Compare proposer share and minimum coalition frequency with the benchmark. A request is a strategic signal, not a stable preference measure. Compare agreement rates and periods used first; then inspect proposer share, the number of positive allocations, and the Gini coefficient. Finally, use the acceptance-by-offer graph to determine whether apparent proposer power was sustained by larger offers to pivotal voters or by voters accepting small amounts.

For the instructor

Elicit opposing predictions: communication as fair coordination and communication as competition. The report can reveal which mechanism better describes the class. Before revealing results, request a quantitative prediction and a causal explanation. After revealing, compare mechanism, outcome, and an alternative interpretation based on reciprocity, inequality aversion, or learning.

7.8 Veto power

The proposal needs three votes and the approval of member E. If E votes no, the proposal fails even when the other four support it. E may be proposer or responder, but E's consent is always required.

The comparison should begin with the institutional constraint rather than a judgment about whether the allocation is fair. Ask the class to identify how many additional supporters the proposer needs, which members can be excluded from the coalition, and what threat is credible after rejection. This sequence separates formal proposal power, voting power, and the ability to wait. The same ECU amount can have a different strategic meaning when the identity of a blocking member or the probability of making the next proposal changes.

Theoretical foundation

The veto makes E indispensable. E should receive more and face less exclusion. The proposer still needs another supporter in addition to E and the automatic proposer vote, so veto power does not eliminate coalition formation.

Research on bargaining with indispensable players and disagreement values shows that formal power can raise demands, while norms and punishment create meaningful departures. Treat experimental evidence as a comparison pattern rather than a numerical target every class should reproduce. Sample size, participant experience, and group history can shift levels. The robust teaching question is whether the institutional change moves agreement, delay, inclusion, or proposer share in the predicted direction.

Compare E's allocation with other responders while conditioning on whether E proposed. Inspect delay as well: an indispensable member can clarify the agreement set or block offers judged insufficient. Compare agreement rates and periods used first; then inspect proposer share, the number of positive allocations, and the Gini coefficient. Finally, use the acceptance-by-offer graph to determine whether apparent proposer power was sustained by larger offers to pivotal voters or by voters accepting small amounts.

For the instructor

Draw the minimum coalition as proposer + E + one additional member. When E proposes, show that E still needs two supporters. This prevents counting the veto vote twice. Before revealing results, request a quantitative prediction and a causal explanation. After revealing, compare mechanism, outcome, and an alternative interpretation based on reciprocity, inequality aversion, or learning.

Experimental evidence and literature

8.1 Foundational model

Baron and Ferejohn (1989) model a legislature in which procedure determines who proposes, what quota approves, and what follows rejection. Their central contribution is to endogenize agenda formation and coalition choice. The closed-rule benchmark emphasizes minimum winning coalitions and proposer advantage. The application keeps those elements while replacing the infinite horizon with three observable periods.

A closed rule means the committee votes on the proposal as offered. It cannot amend within the period. Open-rule designs create different dynamics; Fréchet et al. (2003) find longer delay and greater equality under open rules, along with important departures from point predictions.

8.2 Experimental deviations

Fréchet et al. (2005) compare coalitional bargaining mechanisms and show that theoretical differences do not map perfectly into behavioral levels. Repeated evidence finds proposer advantage but less extraction, more positive allocations, and history-dependent behavior.

The meta-analysis by Baranski and Morton (2022) studies group size, discounting, delay, and distribution across majoritarian experiments. Point predictions receive limited support, while punishment and loyalty emerge off equilibrium. This motivates an instructor report with evolution, inclusion, and vote response rather than a single proposer mean.

8.3 Rules and communication

Miller and Vanberg (2013) compare majority and unanimity and document more rejection and delay under unanimity together with greater inclusion. The result illustrates decision costs: protecting every member can destroy surplus. Both dimensions should be shown before normative evaluation.

Agranov and Tergiman (2014) show that pre-proposal communication can strengthen proposers by revealing demands and creating competition for coalition membership. The structured-message treatment translates this mechanism into numerical requests. It limits conversational richness to maintain privacy and classroom control.

8.4 Using the literature

Present the mechanism and a qualitative prediction first, then classroom results, and published evidence last. This prevents the article from becoming an answer participants imitate. A teaching replication is intended to expose an institutional logic rather than estimate a treatment effect precisely.

Separate model benchmark, systematic published evidence, and contextual classroom observation. Differences do not automatically invalidate any layer. Ask which parameters, experiences, or norms could explain the gap and what additional treatment would discriminate among mechanisms.

8.5 Lesson designs and exercises

8.6 Game theory module

Use one majority negotiation. Derive continuation value and the 68–16–16–0–0 benchmark. After play, solve how logic changes under $\delta = 0.6$, four votes, and unanimity. Grade coalition arithmetic, feasibility, and strategic reasoning rather than memorized numbers.

8.7 Political economy module

Compare majority, supermajority, unanimity, and veto. Assign teams to defend one rule before data. Each must identify what it protects, what cost it creates, and what report measure will test its claim. Close by linking patterns to constitutions, councils, treaties, or budgets.

8.8 Behavioral economics module

Compare equal division, the material benchmark, and observed data. Classify rejections as compatible with continuation value, inequality, reciprocity, or error, acknowledging observational equivalence. Communication is useful for studying signals, competition, and norms inside a strategic environment.

8.9 Organizations module

Interpret members as divisions dividing a budget. Compare equal and biased recognition, then persistence. Discuss how agenda control becomes resources even when everyone votes. Ask students to design a rule that limits power without excessive delay and justify it with report metrics.

8.10 Quantitative exercise

Export data and compute agreement, early agreement, distributed pie, proposer share, positive allocations, and Gini. Estimate a descriptive model of yes votes on offers, period, and treatment. Committee votes are dependent; formal inference requires committee-level analysis or clustered uncertainty.

Advanced feedback cases

9.1 Case 1: classic minimum coalition

The proposer keeps 68, offers 16 to two responders, zero to two, and receives three first-period votes. The material benchmark sees a minimum coalition and full surplus preservation. Ask why offered responders accepted and whether excluded members should reject. Then compare with the full histogram rather than treating one textbook case as the modal outcome.

9.2 Case 2: equal division

A 20-each proposal receives five votes. It is efficient and equal, but the proposer forgoes agenda advantage. Explanations include a focal norm, rejection concern, inequality aversion, and reputation. Check whether equality persists under reassignment and whether offers fall after proposers learn that lower amounts pass.

9.3 Case 3: generous rejection

The proposer keeps 30 and offers 20, 20, 20, and 10, yet fails. Do not label voters irrational. Identify each offer, the continuation, and distribution. Check comprehension. An absolute amount is not generous without the complete allocation and future alternative.

9.4 Case 4: late agreement

The first proposal fails and the second divides 80 ECU. Delay costs 20. Compare absolute amounts and shares: the second proposer can keep a larger percentage but earn fewer ECU than an earlier offer. Ask who benefited from delay and whether rejection was reasonable ex ante.

9.5 Case 5: complete breakdown

All proposals fail and everyone earns zero. Incompatible demands, punishment, error, or coordination failure may explain it. Reconstruct each period and offers to necessary voters. The lesson is that blocking power can destroy the very resource members bargain over.

9.6 Case 6: efficient unanimity

Unanimity produces immediate 20-each agreement. Protection created no delay in this realization. Do not infer causality from one committee; state the descriptive pattern and hypothesize that expected veto induced an inclusive first offer.

9.7 Case 7: cheap veto

E receives five ECU, accepts, and enables a minimum coalition. Formal power did not yield a large payment. Low continuation value, accept-any-positive norms, or inexperience are possible. Compare later rounds and acceptance in the 1–10 interval.

9.8 Case 8: communication and competition

Responders request 25, 20, 15, and 10. The proposer offers 15 and 10 to the two lowest requests and keeps 75. Approval suggests communication enabled discrimination; rejection suggests requests did not reveal thresholds or exclusion triggered solidarity. Message, offer, and vote are distinct decisions.

9.9 Case 9: biased recognition

A proposes six of ten times and earns more. Decompose the gap into proposer frequency and payoff conditional on role. If A also earns more as responder, deference, anticipation, or reciprocity may matter. This prevents attributing every difference mechanically to the lottery.

9.10 Case 10: apparent convergence

Proposer share rises from 25 to 55 percent while immediate agreement also rises. The pattern is consistent with learning about acceptable offers, but it does not prove convergence. Check proposer identities, coalition composition, and sample size; one series may reflect chance or group history.

Data, assessment, and responsible operation

10.1 Minimum data dictionary

Exports contain language, edition, treatment, round, committee, seat, period proposers, budgets, all five allocations, votes, agreement period, and payoffs. Use one row per committee-negotiation for aggregate outcomes and one row per responder-proposal for voting. Four votes in a committee are not statistically independent.

Derived measures should be reproducible: proposer share divides proposer allocation by approved pie; delay loss is 100 minus final budget; inclusion counts positive allocations; minimum coalition compares yes votes with quota; and Gini uses five approved allocations. Breakdowns have no approved distribution and should be marked missing rather than treated as substantively zero inequality.

10.2 Assessment rubric

Criterion	Expected performance
Mechanism	Identifies proposer, quota, automatic vote, delay, and breakdown.
Prediction	Explains continuation value and coalition needs; distinguishes exact and qualitative claims.
Data reading	Uses denominators and separates agreement, allocation, inclusion, and inequality.
Comparison	Links an institutional difference to an outcome and an alternative explanation.
Critical judgment	Avoids unobserved-motive claims and recognizes limits of a class-room sample.

10.3 Privacy and neutrality

Do not collect names, student IDs, affiliations, or real political opinions. Letters are anonymous positions. Project aggregates and identify a committee only by number. Structured communication is numerical to preserve privacy and control. Free conversation would constitute another treatment.

Classroom participation is not research consent. If data will be used beyond teaching, apply institutional requirements. The report hides participant codes, while administrative exports still require responsible storage.

10.4 Troubleshooting and closure

10.5 Wait pages

Waiting is normal while a proposer allocates or responders vote. Use Monitor to locate the stage. Reopen the same link after a closed page. Do not insert a replacement participant without understanding the group effect. Document a permanently incomplete committee and do not reveal while others decide.

10.6 Stale links

“This user does not exist” indicates a link from an old session or replaced database. Create a new session and distribute current links. Do not fabricate users. For local testing, verify port 8145 rather than another family’s port.

10.7 Hidden report

Reveal stays disabled until every active committee-round is complete. Inspect pending participants in Monitor. Reload the instructor report after completion if needed; never ask students to repeat decisions. The hidden state is a pedagogical safeguard.

10.8 Closing checklist

1. Confirm that everyone sees “Activity completed.”
2. Verify zero pending outcomes and reveal the report.
3. Discuss agreement and delay before allocation and voting.
4. Compare recorded predictions with the data and another institution.
5. Export and label data, then close the active room.
6. Record incidents before reusing the configuration.

Configurations and glossary

11.1 Configurations

Basic configurations are `multilateral_bargaining_en_one_negotiation`, `multilateral_bargaining_en_10_fixed_committee`, and `multilateral_bargaining_en_10_reassigned_committees`, with Spanish equivalents. Extended suffixes are `majority`, `unanimity`, `supermajority`, `persistent_proposer`, `biased_recognition`, `high_delay_cost`, `communication`, and `veto`.

11.2 Glossary

Agenda: alternatives eligible for a vote. **Continuation value:** expected utility from rejecting and continuing. **Delay:** movement to another period with a smaller pie. **Inclusion:** number of members with positive allocations. **Minimum winning coalition:** coalition that loses approval capacity if one vote leaves. **Proposer:** member entitled to formulate the allocation. **Quota:** required affirmative votes. **Recognition:** rule selecting the proposer. **Veto:** individually required approval in addition to the quota. **Winning coalition:** votes sufficient for approval.

Recurrent bargaining and a persistent status quo

12.1 An allocation that shapes subsequent bargaining

Bargaining that ends with an agreement teaches agenda power and the cost of rejection. Recurrent bargaining adds a question: how does the allocation already in place affect later choices? The committee does not begin ten independent negotiations. It carries forward a distribution determining each member's allocation whenever no change is approved. The allocation divides a fresh flow of resources; it is neither a savings balance nor a debt between members.

The starting point is section 14.2 of [Osborne \(2025\)](#). Bargaining remains open: each period has resources, a proposer may pass or propose, rejection implements the previous allocation, and approval changes the next default. This activity retains these mechanisms while adapting the horizon to ten known periods and the committee to five members. The book's equilibrium example uses three people and an infinite horizon. Its numerical conclusions therefore do not transfer directly to the classroom activity.

Attention

The game has ten finite periods, integer amounts, and no terminal payoff. It does not implement an infinite-horizon stationary equilibrium or test its patience condition. Discounting weights future payoffs; the budget remains 100 ECU every period. Earlier configurations retain their rules: terminal agreement, automatic proposer support, and a shrinking budget following rejection.

12.2 Rules of the recurrent block

The same five members retain seats A–E for ten periods. A proposer is selected independently each period. Every member has a 20% probability under uniform recognition. With biased recognition A has a 50% probability and each other member has a 12.5% probability. These probabilities do not guarantee exact realized frequencies in ten periods. Small sessions can display unequal opportunities even when recognition probabilities are equal.

The proposer chooses to pass or submit an allocation different from the current one. Passing retains the vector without a ballot. A proposal specifies five nonnegative integers summing to at most 100 ECU. The exhaustive mode requires every new proposal to allocate exactly one hundred. Passing remains possible even if the current allocation leaves resources unused. The form rejects a proposal identical to the current vector: retaining it requires passing. Amounts entered when

passing are ignored.

When a proposal is submitted all five members vote, including the proposer; support is not automatic. Three affirmative votes approve the change. Ballots are private and simultaneous. The screen compares all five current and proposed amounts. The implemented allocation generates current payoffs and becomes the next default. Approval, rejection, and passing lead to another period except after period ten. Unused resources expire and do not add to the next budget.

What participants will see

Rejection implements your current default allocation, which may be positive. Approval does not freeze an allocation forever: a recognized member can propose another change later. Period ten is the last and generates no subsequent income.

12.3 Payoffs and a worked example

Let q_t be the current allocation and z_t a proposal. The implemented vector is $x_t = z_t$ if at least three members approve; otherwise $x_t = q_t$. The next period starts with $q_{t+1} = x_t$. For each member,

$$p_{it} = \text{round}(\delta^{t-1} x_{it}, 2), \quad P_i = \sum_{t=1}^{10} p_{it}.$$

Each period payoff is rounded to two decimals. Gross allocation and weighted payoff are different variables and both are exported. ECU means Experimental Currency Units; the activity does not establish a new monetary conversion rate.

Consider (16, 16, 16, 16, 16) with twenty ECU unassigned. In period 1 the proposer submits (20, 20, 20, 20, 20) and only two members support it. The proposal fails, every member receives sixteen gross ECU, and period 2 starts with the vector of sixteens. This is a rejected current improvement: no one would have received less in that period and everyone would have received more. The indicator describes current allocations without revealing expectations about the future.

In period 2 the equal vector is proposed again and receives three votes. Twenty ECU per member are implemented. With $\delta = 0.9$, each weighted payoff is $0.9 \times 20 = 18$ ECU. In period 3 the proposer passes: twenty persists and each payoff is $0.9^2 \times 20 = 16.20$ ECU. Approval did not close bargaining and passing did not consume the next period's resources. If twenty persists for ten periods, the unrounded sum is $20(1 - 0.9^{10})/(1 - 0.9) \simeq 130.2643$. Records sum separately rounded period payoffs and can differ by a few cents. Discounting by 0.5 changes the weight of this flow without changing gross resources allocated.

12.4 Seven specified comparisons

Mode	Rule and comparison
Zero initial allocation	(0, 0, 0, 0, 0), nonexhaustive proposals, and $\delta = 0.9$: the recurrent reference.
Equal initial allocation	(20, 20, 20, 20, 20): changes only the initial allocation. Compare persistence and beneficiaries.
Concentrated allocation	(60, 10, 10, 10, 10): an initial advantage may persist or be redistributed. Recognition is unchanged.

Initial unused resources	(16, 16, 16, 16, 16): twenty unused ECU allow current improvements for everyone.
Exhaustive proposals	Starts at zero and requires one hundred in every new proposal; passing remains available.
Biased recognition	Starts at zero; A proposes with probability 50% without having additional votes.
Lower future weight	Starts at zero and uses $\delta = 0.5$ rather than 0.9, without changing quota or budget.

Hold language, time, and general instructions constant. The terminal versus recurrent comparison changes several rules together: resources, continuation, and the proposer's vote. It compares complete institutions. To study only the initial allocation, compare two recurrent modes.

12.5 Dynamic intuition and disciplined discussion

The last period has no subsequent opportunity within the game. A decisive ballot compares the current payoff from the proposal against the current default payoff. Before the last period, approval can change future proposals and ballots. Consequently a current improvement need not improve expected continuation value. A strategic explanation requires specified beliefs or future strategies; the activity does not automatically elicit these.

Theoretical foundation

A current improvement and an intertemporal improvement are different objects. A rejected-improvement indicator does not establish that rejection maximizes utility. Persistence does not establish equilibrium either: coordination, distributional preferences, learning, inertia, or misunderstanding may contribute. Separate observation from interpretation.

Osborne's infinite-horizon example shows that reopening can sustain stationary allocations leaving resources unused: moving away from an allocation can change future bargaining. The class explores that intuition under its own finite rules. Do not announce a particular amount of waste as a necessary prediction. An equal allocation may persist or be replaced by a majority. An initial advantage may protect its beneficiary or make that beneficiary a redistribution target. These possibilities motivate questions rather than guaranteed outcomes.

Before the block ask members to identify the initial default, the consequence of rejection, and who votes. Comprehension feedback is question-specific and retains answers. Correct rules without advising proposals or ballots. Afterward ask for a description of a transition: current vector, action, votes, implementation, and next default. Compare early and late periods using their denominators. Do not attribute observed proposal frequency to a biased rule without checking the configuration.

Feedback script

First describe the allocation that persisted and the resources left unassigned. Then distinguish current gains from possible future consequences. An observed ballot alone does not identify fear of later redistribution. Finally compare modes changing only the initial allocation.

As exercises, calculate three periods of payoffs under both discount factors; construct an improvement over sixteen per member and enumerate ballot patterns that reject it; explain why an exhaustive allocation cannot admit a strict improvement for everyone. The last answer should use the resource constraint.

12.6 Private report and records

Each committee has ten potential observations. The report counts completed and pending periods even when opened from the last technical round. Persistence is the proportion of completed periods with identical entry and implemented vectors, including passes and rejections. Approval uses balloted proposals only. Rejected improvements count rejected proposals over proposals weakly improving everyone's current allocation and strictly improving someone's.

The mean and histogram of unassigned resources use all completed periods. The Gini compares the five implemented allocations; a zero vector receives Gini zero by convention without implying a desirable outcome. Evolution displays persistence, unused resources, and inequality by period. Aggregates do not identify members. Reveal is manual and accommodates partial records: state the denominator before interpreting them.

The private CSV downloads this session only: fifty rows per committee, one per participant and active period. Fields record codes, group, seat, current vector, action, proposal, ballot, implementation, unused resources, weight, and payoff. Pending outcomes remain empty. A negative ballot differs from an absent response. The native download has one row per participant with rounds in columns. Retain the original files under instructor access.

Checkpoint

Confirm ten periods, explicit closure, correct carryover, and a download for the selected session. Do not repeat decisions to fill a table. Document unfinished committees and retain pending fields.

12.7 Access and new configurations

The family has 36 configurations: three basic and fifteen extended per language, using the same four rooms. New suffixes are `statusquo_zero`, `statusquo_equal`, `statusquo_concentrated`, `statusquo_slack`, `statusquo_exhaustive`, `statusquo_biased`, and `statusquo_low_discount`. They follow the corresponding extended room prefix. The local preview is <http://localhost:8145/demo>. Upload and deployment are required before these additions appear in the public catalog.

Period 1 of 10 · Extended version

Allocations across periods

Five members A–E stay together for ten periods. Each period provides 100 fresh ECU; unused resources cannot be saved or transferred.

Resources and unit of account

Each period has 100 fresh ECU. The proposer may pass or submit an allocation; all five members vote.

Initial default allocation (ECU): A: 60, B: 10, C: 10, D: 10, E: 10.

Ten periods with the same committee. Period t weight: $0.9^{(t-1)}$; resources do not physically accumulate.

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

This session does not convert ECU into real money.

Concentrated initial allocation

The initial allocation gives A 60 ECU and every other member 10 ECU.

Sequence

1. A proposer is independently selected each period.
2. The proposer may pass or submit an allocation different from the current one.
3. Passing implements the current allocation without a ballot. A proposal leads all five members to vote privately, including the proposer.
4. At least 3 of 5 votes approve a proposal. Rejection implements the current allocation.
5. The implemented allocation generates this period's payoffs and becomes next period's default. Approval does not end the activity. Period ten is the last.

Initial default allocation

Member	Initial default allocation
A	60 ECU
B	10 ECU
C	10 ECU
D	10 ECU
E	10 ECU

Unassigned: 0 ECU

Discount factor $\delta = 0.9$

Probability of proposing: Each member: 20%

A new proposal may allocate between 0 and 100 ECU; unassigned resources pay no one.

ECU means Experimental Currency Units. Your payoff in period t is your allocation multiplied by $\delta^{(t-1)}$. Each period payoff is rounded to two decimals. The total is the sum of ten period payoffs, with no additional payoff after period 10. Discounting changes payoffs, not the 100 ECU budget.

Continue

Figure 12.1: Renewed resources and each member's initial allocation.



Period 1 of 10 · Extended version

Pass or propose an allocation

Compare against the current allocation. If passing, leave the amounts blank: they are ignored. If proposing, enter five integer amounts.

Initial allocation with unused resources

The initial allocation gives each member 16 ECU and leaves 20 ECU unassigned.

Proposer: **E** · This period's weight: 1,0

A new proposal may allocate between 0 and 100 ECU; unassigned resources pay no one.

Action

Member	Current allocation	New allocation
A	16 ECU	20
B	16 ECU	20
C	16 ECU	20
D	16 ECU	20
E	16 ECU	20

Figure 12.2: Pass or propose a change from the current allocation.

Period 1 of 10 · Extended version



All five members vote

Your vote is private. The table shows each member's allocation after rejection and after approval. Your ballot is required even if you submitted the proposal.

Initial allocation with unused resources The initial allocation gives each member 16 ECU and leaves 20 ECU unassigned.

Proposer: D · Your default allocation: 16 ECU · Your allocation if approved: 20 ECU

Member	Current allocation	New allocation
A	16	20
B	16	20
C	16	20
D	16	20
E	16	20

Unassigned: 0 ECU

☐ Accept

☐ Reject

Submit vote

Figure 12.3: All five members compare and vote on the distributions.

Period 1 of 10 · Extended version



Period result

The proposal was rejected; the current allocation is retained.

Initial allocation with unused resources The initial allocation gives each member 16 ECU and leaves 20 ECU unassigned.

Member	Current allocation	Implemented allocation
A	16	16
B	16	16
C	16	16
D	16	16
E	16	16

Affirmative votes
0/5

Unassigned
20 ECU

This period's weight
1.0

Your weighted payoff
16.0 ECU

Continue to the next period

Figure 12.4: Rejection retains the allocation and unused resources.

Instructor report: persistent allocations

Initial allocation with unused resources · same committee

Participants 5	Committee-periods 10	Completed 10/10	Pending 0
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[Download this session's data \(CSV\)](#)
Long CSV: one row per participant and active period, including empty pending fields. Participant identifiers appear only in the private download.
Reveal when appropriate. Partial results show their denominator and pending periods.

Hide results			
Allocation unchanged 90,0%	Periods with pass 80,0%	Proposal approval 50,0% n=2	Rejected current improvements 1/2
Mean unused resources 2 ECU	Mean implemented Gini 0,0		

Unused resource distribution



Figure 12.5: Report detail with indicators and denominators.

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